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INFLUENCE OF BEHAVIORAL FACTORS ON HEALTH INDICATORS OF SCHOOL STUDENTS AT THE REGIONAL LEVEL

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The article analyzes the state of health of schoolchildren aged 10–15 in Kremenchuk and investigates the influence of behavioral risk factors. It was established that the movement activity of schoolchildren is insufficient, 19.2 % have an increased BMI. Detected violations of food behavior, manifested in the replacement of a "healthy snack" with sweets in 30.8 % or refusal of snacks in 12.2 %. 12.8 % of schoolchildren note insufficient duration of night sleep, which leads to overtiredness. It has been established that children 13–15 years are significantly less engaged in physical education; do not follow the rest regime, reducing the time of night sleep; they use fruits, vegetables or yogurts for snacks much less often, preferring snacks and sweets. It was found that 56.4 % of children get sick more than once a year, the influence of behavioral risk factors on the frequency of colds was proven: children who did not do physical education were 3 times more getting colds than those who did active lifestyle; "unhealthy" snacking on sweets and snacks increased the risk of frequent colds by 2 times.

Key words: children and teenagers, health, behavioral risk factors.

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ВПЛИВ ПОВЕДІНКОВИХ ФАКТОРІВ НА ПОКАЗНИКИ ЗДОРОВ'Я ШКОЛЯРІВ НА РЕГІОНАЛЬНОМУ РІВНІ

В статті проаналізовано стан здоров'я школярів 10–15 років Кременчука та досліджено вплив поведінкових факторів ризику. Встановлено, що рухова активність школярів недостатня, у 19,2 % виявлений підвищений ІМТ. Виявлені порушення харчової поведінки, що проявляється в заміні «корисного перекусу» на солодощі у 30,8 % або відмові від перекусів у 12,2 %. 12,8 % школярів відмічає недостатню тривалість нічного сну, що призводить до перевтоми. Встановлено, що діти 13–15 років достовірно менше займаються фізкультурою; не дотримуються режиму відпочинку, скорочуючи час нічного сну; значно рідше використовують для перекусів фрукти, овочі або йогурти, віддаючи перевагу снекам та солодощам. З'ясовано, що 56,4 % дітей хворіє більше, ніж 1 раз на рік, доведено вплив поведінкових факторів ризику на частоту простудних захворювань: діти, які не займалися фізкультурою, в 3 рази частіше хворіли на простудні захворювання, ніж ті, які вели активний спосіб життя; «некорисні» перекуси солодощами та снеками збільшували ризик частих простудних захворювань в 2 рази.

Ключові слова: діти та підлітки, здоров'я, поведінкові фактори ризику.

The study is a fragment of the research project "Medical and social justification of optimization of approaches to management and organization of various types of medical care for adults and children during the period of health care reform", state registration No. 0119U102926.

The health of children and youth is an integral index of the general well-being of society and an index of social and environmental problems [1]. In modern civilization, the problems of quality of life and preservation of health are a global problem [4, 7, 8]. The prevalence of diseases among children aged 0–17 years in 2016 was 1,777.16 registered cases of diseases per 1,000 children, while in 1994 it was 1,263.5,

i.e., an increase in the prevalence rate by 40.6% over the past two decades [4]. It must be noted that such dynamics of the prevalence of childhood diseases indicate a powerful negative impact on the children's body of an ecologically polluted environment, everyday chemicals, electromagnetic radiation, the unhealthy lifestyle of most Ukrainian families, hereditary factors, irrational nutrition and the spread of bad habits [1, 6, 7]. The COVID-19 pandemic had a significant impact on the health and physical activity of children due to the transition to distance learning. In children who studied only remotely (virtually), physical activity decreased by half compared to the indicators of children who attended school, communication with friends decreased from 86 % to 70 %, emotional disorders were observed in 25 % of children in distance education compared to 16% in children in the usual form of education [5].

Human health largely depends on lifestyle, value hierarchy and relationship with nature. There is great freedom in choosing the means and methods of physical recreation, their flexibility and variability. According to B. Voynarovska, "a healthy (strengthening) lifestyle is a conscious behavior aimed at improving, preserving and restoring health. It is based on: body care and mental hygiene, physical activity, healthy eating, safe behavior, periodic medical examinations, refusal to smoke and use drugs, moderation in alcohol consumption" [15].

Young people do not see a direct connection between their behavior and health. Unfortunately, they are not interested in sanitary, educational and preventive actions that would provide them with a better, healthier, more successful life [3, 11, 14].

Two important aspects of encouraging behavior change in children and adolescents are: building a conscious connection between habits, lifestyle and health outcomes and increasing self-efficacy for behavior change by setting achievable goals. Health education can improve their attitudes towards Healthy Lifestyle and reduce cardiovascular risk. This can be done by engaging them in activities that promote healthy habits and help them achieve personal goals that meet healthy lifestyle guidelines [9, 14]. It is necessary to popularize the values of a healthy lifestyle among the younger generation at the regional level, including through a survey, which will allow, on the one hand, to study their attitude to this issue, and on the other hand, to draw the attention of schoolchildren to the importance of observing healthy lifestyles, which determined the relevance of this research.

The purpose of the study was to analyze the state of health of schoolchildren aged 10–15 in Kremenchuk and to investigate the impact on them with behavioral risk factors.

Materials and Methods. The study was carried out at Lyceum No. 10 in Kremenchuk in 2021. 158 children took participation in the survey. At the initial stage, an explanatory session was held in the form of a meeting with parents and separately with children regarding the importance of HL (healthy lifestyle) in schoolchildren. Then questionnaires were distributed to children of the 6th, 7th, and 8th grades with permission parents and the ethics commission of the Department of Education. Questionnaire used the standard that was offered to students of the University of Edinburgh [13]. Anthropometric data of children (height and weight) were evaluated at the school by trained personnel. There were data from children's questionnaires available to parents who had the opportunity to control their answers about health, lifestyle. The answers to the questions allowed not only to evaluate indicators of students' behavioral factors, but also gave them the opportunity themselves reflect on your good and bad habits.

At the beginning of the study, a one-dimensional analysis – the frequencies of both demographic criteria and responses to questions were asked about the health care system. The relative values were compared by using the Pearson's criterion χ^2 (χ–square).

Risk factors were determined by the questionnaire method and calculated
odds ratio: we calculated the odds ratio (OR), 95 % confidence interval (95 % CI).

We calculated the OR coefficient according to formula (1):

$$OR = \frac{ad}{bc}, \text{ where:}$$

a – the number of schoolchildren with disorders in the presence of a risk factor; b – the number of schoolchildren without disorders in the presence of a risk factor; c – the number of schoolchildren with disorders in the absence of a risk factor; d – the number of schoolchildren without disorders in the absence of a risk factor.

The dependent variables were: age, BMI, frequency of colds diseases.

Results of the study and their discussion. 158 children, of average age, took part in the study respondents was 12.4±1.2, (max = 15; min=10), of which 113 were female (72.4 %) and male – 43 (27.6 %). The distribution of children by age was as follows: 10 years – 1 (0.6 %), 11 – 41 (26.2 %), 12 – 47 (30.1), 13 – 24 (15.4 %), 14 – 38 (24.4 %), 15 –5 (3.2 %). In the course of the research, individual indicators were studied health of schoolchildren.

Increased BMI was detected in 30 (19.2 %) children, in 126 (80.8 %) it was normal.

We studied the frequency of SARS and found that 68 (43.6 %) children were sick once a year, and most of them – 88 (56.4 %) several times a year, which may indicate the intense work of the immune system due to non–compliance with the HL.

Physical activity is an important indicator of HL. More than 4 hours per week, almost half of the respondents – 72 (46.2 %), 1–2 hours per week
week – 29 (18.6 %), 3–4 hours per week – 36 (23.1 %) (Fig. 1).

Younger children engaged in physical education significantly more than older children (p=0.019). Attitudes to these activities change with age, as children seniors are more burdened with the school program and spend less time walking yard.

Physical activity can happen not only when children allocate it special hours, but also when they go for a walk, which is also positive affects their cognitive abilities and helps to consolidate new neurons connections That is why the questionnaire question "How do you move around the city?": on foot – 74 (47.4 %); on roller skates, skateboard – 4 (2.6 %), on by city transport, and then a few go on foot – 43 (27.6 %), by car with by their parents – 35 (22.4 %).

Children's nutrition is the main factor directly associated with epidemic of non–communicable diseases in adults (WHO, 2015, 2017). It was researched what children at school eat as snacks: fruits, vegetables, yogurt consumed by 85 (54.5 %); salted peanuts, chips, crackers – 4 (2.6 %), 19 (12.2 %) do not snack, sweets, chocolate, cakes, cookies – 48 (30.8 %) (Fig. 2).

Fruits, vegetables, and yogurts are mostly eaten by children as snacks younger age by 53 % more often than 13–15–year–olds (p=0.017). It is obvious that younger schoolchildren, being under the care of their parents, have more advantages in healthy snacks.

The study of the duration of sleep in students of the Kremenchug Lyceum showed that that 8 hours sleep 82 (52.6 %); 9–10– 49 (31.4 %) less than 8 – 20 (12.8 %), more than 10 – 5 (3.2 %) (Fig. 3).

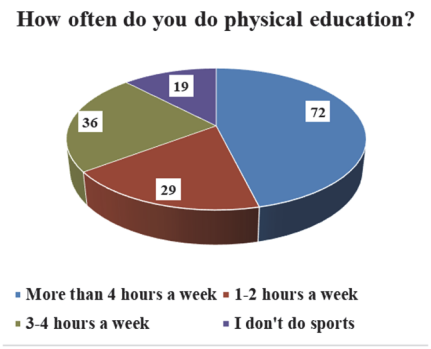

Fig. 1. Distribution of answers regarding physical education among students of the Kremenchug Lyceum.

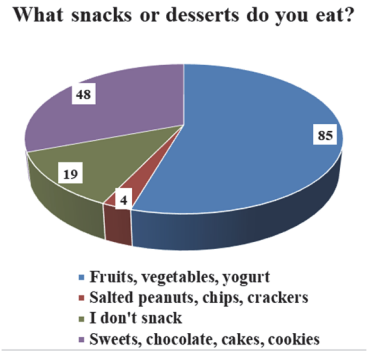

Fig. 2. Distribution of school-children's answers about snacks.

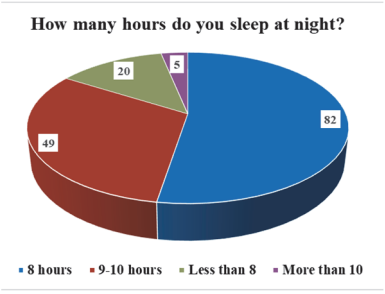

Fig. 3. The specific weight of schoolchildren's answers regarding sleep duration.

Children aged 13–15 years have 79 % less sleep duration than 10–12–year–olds. At the next stage of our research, the relationship between children's age and behavioral risk factors was studied (Table 1).

Table 1

Schoolchildren distribution by age and behavioral factors

Behevioral factors	Children 10–12 year–olds abs. (%) n=88	Children 13–15 year–olds abs. (%) n=68	χ^2	Odds ratio (CI 95 %)	P
Sleep (less than 8 hours), n=20	5 (5.7)	15 (22.1)	9.205	0.213 (0.073–0.620)	0.003
Sleep (More than 8 hours), n=136	83 (94.3)	53 (77.9)			
Physical education (not engaged), n=19	6 (6.8)	13 (19.1)	5.425	0.310 (0.111–0.864)	0.019
Physical education (engaged), n=138	82 (93.2)	55 (80.9)			
Snacks (sweets), n=48	23 (26.1)	25 (36.8)	2.034	0.609 (0.307–1.207)	0.106
Snacks (everything else), n=108	65 (73.9)	43 (63.2)			
They don't have a snack, n=19	8 (9.1)	11 (16.2)	1.800	0.518 (0.196–1.370)	0.137
All others, n=137	80 (90.9)	57 (83.8)			
Salted peanuts, n=4	2 (2.3)	2 (2.9)	0.069	0.767 (0.105–5.592)	0.587
All others, n=152	86 (97.7)	66 (97.1)			
Fruits, n=85	55 (62.5)	30 (44.1)	5.227	0.474 (0.249–0.902)	0.017
All others, n=71	33 (37.5)	38 (55.9)			
Car, n=35	22 (25.0)	13 (19.1)	0.763	1.410 (0.651–3.056)	0.249
All others, n=121	66 (75.0)	55 (80.9)			

When studying the influence of behavioral risk factors on the BMI of schoolchildren, no significant differences were found.

The next step in our research was to examine the impact behavioral risk factors for the frequency of colds. Children who those who did not do physical education were 3 times more likely to suffer from colds diseases than those who led an active lifestyle of higher education 3.288 (1.038–10.413) (p=0.028). Sweet snacks also increased the risk of frequent of colds in children is almost 2 times higher than average 1.857 (1.914–3.773) (p=0.049) (Table 2).

Table 2

Distribution of schoolchildren according to the frequency of SARS and behavioral diseases factors

Behevioral factors	Often were sick abs (%) n=113	Rarely were sick abs (%) n=43	χ^2	Odds ratio (CI 95 %)	P
Sleep (less than 8 hours), n=20	12 (13.6)	8 (11.8)	0.120	1.184 (0.455–3.082)	0.461
Sleep (more than 8 hours), n=136	76 (86.4)	60 (88.2)			
Physical education (not engaged), n=19	15 (17.0)	4 (5.9)	4.469	3.288 (1.038–10.413)	0.028
Physical education (engaged), n=138	73 (83.0)	64(94.1)			
Snacks (sweets), n=48	32 (36.4)	16 (23.5)	2.966	1.857 (1.914–3.773)	0.049
Snacks (everything else), n=108	56 (63.6)	52 (76.5)			
They don't have a snack, n=19	10 (11.4)	9 (13.2)	0.126	0.840 (0.321–2.199)	0.454
All others, n=137	78 (88.6)	59 (86.8)			
Snacks (salted, nuts), n=4	1 (1.1)	3 (4.4)	1.647	0.249 (0.025–2.449)	0.220
All others, n=152	87 (98.9)	65 (96.5)			
Snacks (fruits), n=71	43 (48.9)	28 (41.2)	0.914	1.365 (0.721–2.585)	0.214
All others, n=85	45 (51.1)	40 (58.8)			
Car, n=35	22 (25.0)	13 (19.1)	0.763	1.410 (0.651–3.056)	0.249
All others, n=121	66 (75.0)	55 (80.9)			

The results of our study of the effect of behavior on the health of children and adolescents in general confirm the results of others studies conducted in different regions.

The problem of childhood obesity has recently reached a new level: over the past 20 years, the number of overweight children has increased by 2–3 times. Experts claim that the rapid scientific and technical development and automation will increase this indicator several times more [12]. We found increased BMI in 30 (19.2 %) children, as well as insufficient motor activity of children was noted.

Most children get sick with SARS 1–2 times a year, at most 4–5 times, and this incidence is highest in children of early preschool age, which are associated with the relative immaturity of the child's immune system at this age, with formation of the lymphoepithelial pharyngeal ring. At the same time, part children suffer from respiratory infections much more often than their peers [6]. Therefore, we studied the frequency of SARS and found that 56.4 % of children were sick several times a year, which may indicate hard work of the immune system due to non–adherence to dietary fiber.

Children's nutrition is the main factor directly associated with epidemic of non–communicable diseases in adults [11]. Moreover, the need to establish regional ones is emphasized features of nutrition with the development of appropriate corrective measures [13, 14]. A properly organized snack in the form of fruits, vegetables, yogurt, will form the correct eating habits in the child, which will be a guarantee of healthy eating habits in the child adulthood [10]. Snacks were evaluated from these positions: fruits, vegetables, yogurt used by 54.5 % of children; salted nuts, chips, crackers – 2.6 %, no snacks 12.2 %, sweets, chocolate, cakes, cookies – 48 (30.8 %).

Sleep, as one of the main components of healthy lifestyle, has an impact on academic performance, as well as feelings of anxiety, deviant behavior, depressive symptoms, smoking [12]. Study of the duration of sleep in students of the Kremenchug Lyceum showed that 82 (52.6 %) sleep for 8 hours; 9–10– 49 (31.4 %) less than 8–20 (12.8 %), is greater than 10 – 5 (3.2 %). Researchers of the Institute of Public health named after O.M. Marzeev of the National Academy of Sciences of Ukraine, it was established that what the older the student, the shorter the duration of his sleep [3], which was confirmed by the results of our research. 79 % of children aged 13–15 years sleep less than 10–12 yearly.

Conclusions

1. As a result of the conducted research, it was established that motor activity of schoolchildren aged 10–15 is insufficient for the part of children who do not study physical education (12.8 %) and get to and from school by car with their own parents (22.0 %). The consequence of this can be considered that 30 children (19.2 %) was found in elevated BMI.

2. There is a violation of eating behavior, which manifests itself in substitution almost a third of children (30.8 %) have a “healthy snack” on sweets, or general refusal of snacks while studying (12.2 %).

3. Part of schoolchildren (12.8 %) notes insufficient duration of night sleep, which lasts less than 8 hours, which leads to a violation of the regime rest and fatigue.

4. It was established that children of older adolescence (13–15 years old) reliably pay less attention to physical education (odds ratio 0.310 (0.111–0.864) (p=0.019)); do not observe the rest regime, reducing the time of night sleep (odds ratio 0.213 (0.073–0.620)); much less often used for snacks fruits, vegetables or yogurts, preferring snacks and sweets (p=0.017). These facts can be explained by the weakening of the parental control at this age compared to younger children.

5. It was found that the majority of children (56.4 %) have a frequency of colds diseases more than once a year, and the influence of behavioral ones has been proven risk factors for the frequency of colds: children who did not exercise physical education, were 3 times more likely to suffer from colds than those who led an active lifestyle, odds ratio 3.288 (1.038–10.413) (p=0.028)); “unhealthy” snacking on sweets and snacks also increased the risk of frequent colds in children almost 2 times (odds ratio 1.857 (1.914–3.773) (p=0.049)).

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